EXHIBIT 11
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HB 68

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Medical Effects of marijuana

How Does Marijuana Affect the Brain?

Marijuana intoxication can cause distorted perceptions, impaired coordination, difficulty in thinking and problem solving, and problems with learning and memory. Research has shown that marijuana's adverse impact on learning and memory can last for days or weeks after the acute effects of the drug wear off.[1] As a result, someone who smokes marijuana every day may be functioning at a suboptimal intellectual level all of the time.

Research on the long-term effects of marijuana abuse indicates some changes in the brain similar to those seen after long-term abuse of other major drugs. For example, cannabinoid withdrawal in chronically exposed animals leads to an increase in the activation of the stress-response system[3] and changes in the activity of nerve cells containing dopamine.[2] Dopamine neurons are involved in the regulation of motivation and reward, and are directly or indirectly affected by all drugs of abuse.

1 Pope HG, Gruber AJ, Hudson JI, Huestis MA, Yurgelun-Todd D. Neuropsychological performance in long-term cannabis users. Arch Gen Psychiatry 58(10):909–915, 2001.

Addictive Potential

Long-term marijuana abuse can lead to addiction; that is, compulsive drug seeking and abuse despite its known harmful effects upon social functioning in the context of family, school, work, and recreational activities. There is a known 10% addiction rate. Long-term marijuana abusers trying to quit report irritability, sleeplessness, decreased appetite, anxiety, and drug craving, all of which make it difficult to quit. These withdrawal symptoms begin within about 1 day following abstinence, peak at 2–3 days, and subside within 1 or 2 weeks following drug cessation.[2]

[2]Budney AJ, Vandrey RG, Hughes JR, Thostenson JD, Bursac Z. Comparison of cannabis and tobacco withdrawal: Severity and contribution to relapse. J Subst Abuse Treat, e-publication ahead of print, March 12, 2008

Marijuana and Mental Health

A number of studies have shown an association between chronic marijuana use and increased rates of anxiety, depression, suicidal ideation, and schizophrenia. Some of these studies have shown age at first use to be a factor, where early use is a marker of vulnerability to later problems. However, at this time, it is not clear whether marijuana use causes mental problems, exacerbates them, or is used in attempt to self-medicate symptoms already in existence. Chronic marijuana use, especially in a very young person, may also be a marker of risk for mental illnesses, including addiction, stemming from genetic or environmental vulnerabilities, such as early exposure to stress or violence. At the present time, the strongest evidence links marijuana use and schizophrenia and/or related disorders.[3] High doses of marijuana can produce an acute psychotic reaction; in addition, use of the drug may trigger the onset or relapse of schizophrenia in vulnerable individuals.

3Moore TH, Zammit S, Lingford-Hughes A, et al. Cannabis use and risk of psychotic or affective mental health outcomes: A systematic review. Lancet 370 (9584):319–328, 2007

Effects on the Heart

Marijuana increases heart rate by 20–100 percent shortly after smoking; this effect can last up to 3 hours. In one study, it was estimated that marijuana users have a 4.8-fold increase in the risk of heart attack in the first hour after smoking the drug,4 This may be due to the increased heart rate as well as effects of marijuana on heart rhythms, causing palpitations and arrhythmias. This risk may be greater in aging populations or those with cardiac vulnerabilities.

4Mittleman MA, Lewis RA, Maclure M, Sherwood JB, Muller JE. Triggering myocardial infarction by marijuana. Circulation 103(23):2805–2809, 2001.

Effects on the Lungs

Numerous studies have shown marijuana smoke to contain carcinogens and to be an irritant to the lungs. In fact, marijuana smoke contains 50–70 percent more carcinogenic hydrocarbons than does tobacco smoke. Marijuana users usually inhale more deeply and hold their breath longer than tobacco smokers do, which further increase the lungs' exposure to carcinogenic smoke. Marijuana smokers show dysregulated growth of epithelial cells in their lung tissue. Marijuana smokers can have many of the same respiratory problems as tobacco smokers, such as daily cough and phlegm production, more frequent acute chest illness, and a heightened risk of lung infections. A study of 450 individuals found that people who smoke marijuana frequently but do not smoke tobacco have more health problems and miss more days of work than nonsmokers.[5] Many of the extra sick days among the marijuana smokers in the study were for respiratory illnesses.

5 Polen MR, Sidney S, Tekawa IS, Sadler M, Friedman GD. Health care use by frequent marijuana smokers who do not smoke tobacco. West J Med 158(6):596–601, 1993

Useful sources and websites:

http://www.nida.nih.gov/Infofacts/marijuana.html

http://www.ama-assn.org/ama/no-index/about-ama/13625.shtml

Joy JE, Watson S Jr, Benson JA Jr, eds. *Marijuana and Medicine. Assessing the Science Base.* Division of Neuroscience and Behavioral Health, Institute of Medicine. National Academy Press: Washington, DC; 1999

http://www.justice.gov/dea/marijuana_position.html

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2269704/

http://leg.mt.gov/content/Committees/Interim/2009_2010/Children_Family/Staff_Reports/med-marijuana-emerging-issues-april2010.wpd.pdf